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Разработка мобильного приложения «Мир УрФУ»

Недостаточная информатизация образовательного процесса одна из главных проблем университета. Данная статья представляет мобильное приложение, которое позволит оптимизировать как учебную, так и внеклассную деятельность студентов и сотрудников университета.

Development of the mobile application «Mir UrFU»

The national ranking of higher education institutions is based on the combination of several indicators, one of which is Innovation and Entrepreneurship. It reflects the level of optimization of the educational process and the efficiency of IT services, such as mobile apps, web sites, etc. Thus, it can be assumed that information technology is the key to effective education and, therefore, to improving the reputation of Ural Federal University (UrFU).

The research identified the following problems that the university faces on a daily basis: the complexity of interaction between students, faculty, administration, and different university departments, excessive bureaucracy, lack of informatization of educational processes, lack of individual approach to every student, inefficient use of information resources of the university.

The purpose of this article is to study the possibility of establishing an interactive information platform, which will enable effective interaction between students and teachers with the help of virtual environment, and which may be used not only in this university, but also beyond it.

The research focuses on the creation of a multifunctional mobile application which will allow the stakeholders (i.e. students, lecturers,

administration, and university departments) interact with each other in real time. Every group will have their own set of rights. The students, for instance, will have access to educational resources, the university score-ranking system, the schedule, news; they will also be able to send applications online, fill in questionnaires and surveys. The teachers will have an opportunity to provide contact information, communicate with other users of the application, receive in-house news, and have access to the score-rating system. The administrative staff will be able to alert students and teachers, conduct surveys, contact partners, and publish information about different events. University unions will send newsletters, conduct surveys, contact the students directly.

To reach the goals of this research, the design team will have to:

- analyse the statistics,
- analyse the suggestions of the main stakeholders,
- examine the relevance of the application to the university educational process,
- establish the functionality of the application taking the statistical data and user preferences into account,
- identify the optimal technology for the application development and its further integration with other university services,
- to evaluate the feasibility of the proposed product.

According to the national rating of universities conducted by "Interfax" (<http://www.univer-rating.ru/>), Ural Federal University takes 15th overall position. The rating is based on the following indicators (UrFU position is provided in brackets): educational activities (11th), research (10th), socialization (7th), the university brand (4th), innovation and entrepreneurship (17th) (see Diagram 1).

First, 1500 people participated in the survey whose aim was to find out their opinion about the existing application and their expectations of the application under development.

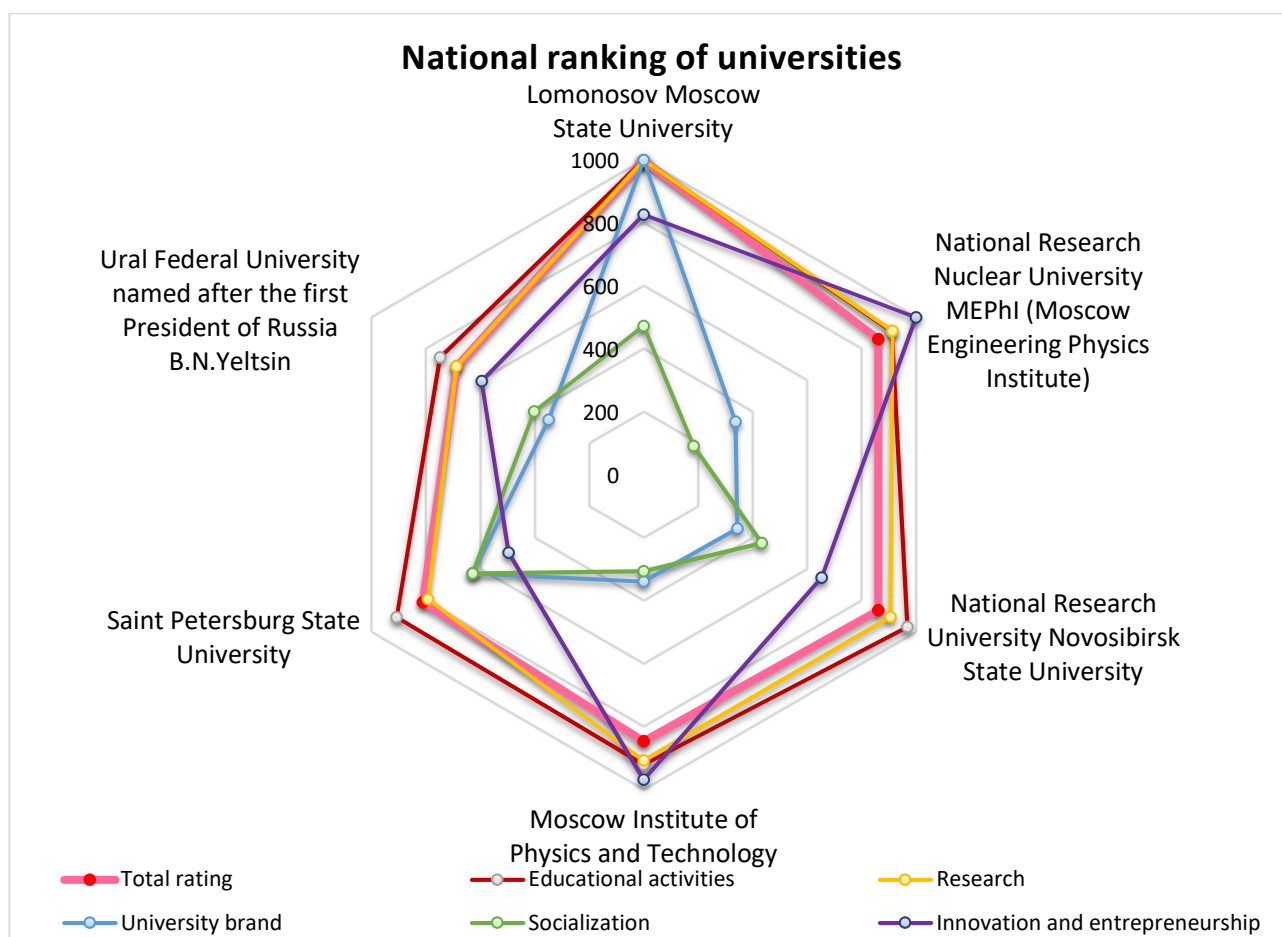


Diagram 1 – National ranking of universities

To implement all the functionality of the application, it is necessary to:

- 1) develop an API for all the university services with a view to their integration into a single environment, which will be convenient for the developers and users and will make the development and testing of any new applications faster and more effective;
- 2) create a flexible system that will identify the users' rights and provide access to the appropriate functionality;
- 3) design a database, which will systematize data and save it for further analysis and reference;
- 4) optimize data flows for the smooth operation of the application;
- 5) write the server-side code;
- 6) design the layout.

Finally, testing the application and conducting the pilot project will become possible.

The innovative component of the product is the integration of two functional areas, i.e. UrFU official website information base and the messengers, like Telegram or VK.

The implementation of the app takes time and money. The application design will take about 3 months. Its testing is supposed to take another 6 months. As for the expenses, this project was calculated by the method of weighted average cost, as it is expected that students will perform part of the work, and the rest will be done by professional developers. The approximate cost of the pilot project constitutes 429, 175 rubles (Table 1).

The financial model for the first 6 months	
Cost of implementation:	360175
- creating an account on the AppStore	6125
- creating an account on Google Play	1550
- publication in the AppStore and Google Market	2000
- layout design	44000
- layout design implementation	18000
- database development	35000
- writing server-side code	92500
- APIs development for university sites	150000
- testing	11000
Additional:	69000
- hosting server rent	24000
- error correction	45000
Total	429175

Table 1 – The financial model for the first 6 months

The ideal university of the future is the interaction between teachers and students, which will optimize the learning process and make it easier. We propose the concept of the university of the future, which will be able to change the idea of educational effectiveness, focusing on a continuous exchange of information and feedback between the key university stakeholders.

To summarize, nowadays no prestigious university can exist without effective use of information technologies, different websites, mobile apps because the future belongs to innovations. Since the university does not

have a convenient unified service that can quickly provide real-time interaction between its stakeholders, our initiative may be widely welcomed in that it can improve low informatization level mainly by creating the university's own API.

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Система ФАПЧ

Приведены результаты исследований системы фазовой автоподстройки частоты с учетом и без учета аддитивных помех, сопровождающих эталонный сигнал. Использование метода теории выбросов проведен теоретический анализ зависимости вероятности срыва слежения (синхронизации) за заданное время наблюдения от отношения мощностей сигнала и помехи в канале эталонного сигнала. Для получения более точных результатов разработана имитационная модель системы в пакете динамических систем «Simulink» в среде Matlab, с использованием которой получены основные характеристики системы

The PLL

Phase-locked loop system is a multifunctional system, which is used for frequency synchronization, multiplexing and channel separations, frequency conversion and multiplication, and for other purposes. PLL is a system of automatic regulation that adjusts the phase-controlled generator in accordance with the value of the phase reference signal.

Digital simulation of the PLL implemented in Matlab package applications. Model PLL with different types of filters constructed in a graphical environment Simulink. Types of system: PLL with inertial link, with proportional-integrating filter, with izodromny filter.

The principle of operation of the system